Project Description 15-A-2
18-C

INTRODUCTION

~~Lee~~ Affiliated Mining is considering processing nearby Swansea Dumps and certain other dump material in the immediate area, first by froth flotation. The initial material should adequately supply the plant for a period of 6 to 48 months at a projected tonnage rate of 250 TPD.

Later, in an expansion of the existing facilities, the Company plans to process the 300,000 tons of material immediately to the west of the proposed plant site by a combination of flotation and cyanide leaching.

PROJECT LOCATION

The North Lilly project site is located in Juab County, Utah, approx. 3 miles south of Eureka and 40 miles southwest of Provo (Plates I - III). The site lies at the foot of the East Tintic Mountains on an alluvial deposit at an elevation of approx. 6,000 ft. From the ground surface, water is approx. 400 feet.

PHASE I - FLOTATION
GENERAL PLAN

The process is relatively straight forward. The Plant will be smaller but similar to that operated by Kennecott at the nearby Burgin Mine.

It involves crushing of the ore, grinding it to the proper size to adequately liberate minerals from attached waste material, and finally the addition of air and reagents to the agitated pulp to separate the small amount of mineral from the waste. The waste from the operation will be discharged to a tails pond.

DESCRIPTION
GRUSHING

Fugitive dust from the crushing operation is the only potential source of air pollution expected from the entire operation.

Potential dust problem areas are at vibrating screen decks, belt transfer points and the reduction of rock at the crusher.

Preventative fugitive dust measures:

1. Water sprayers, using low volumes of water offer the most economical control of fugitive dust at vibrating screens and transfer points.

   However, the moisture content of the dumps to be processed has been determined to be sufficiently high (>8 %). That dust will not be a problem and, in fact, the moisture will be detrimental to crusher production. Sprayers will be installed appropriately to minimize airborn dust, if dry ore conditions prevail.

2. As solid rock is reduced to three times its original size, fine particles blown by air turbulence from the high speed crusher may escape into the atmosphere. 90% of this dust is trapped by skirting, extending from the base of the crusher and touching the belt. Residual dust particles can be precipitated by the use of a cyclone separator. Cyclones have been demonstrated to be an effective means for achieving dust control.

GRINDING

Minus 4 mesh material will be ground to 100% passing 150 mesh, which is considered sufficient to adequately liberate precious metals. A screen analysis of the tail is given in TABLE I.

TABLE I - TAILINGS ANALYSIS

MESH PRODUCT	WT % RETAINED	CUMULATIVE WT % RETAINED	CUMULATIVE WT % PASSING
150	1.2	1.2	98.8
150 x 200	24.3	25.5	74.5
200 x 325	27.2	52.7	47.3
325 x 400	23.1	75.8	24.2
-400	24.2		

A tailing with a similar size distribution as above from the Cortel Gold Mine was mixed with low quantities of bentonite. The treated tailings were used as a impermeable base for a cyanide leaching pad.

FLOTATION

The material to be processed becomes mildly acidic when combined with water, therefore, a modifier such as lime, soda ash, or sodium hydroxide must be added to neutralize the pulp or raise the PH to mildly basic to effect the most efficient mineral flotation. Pyrite is the most abundant mineral and it is best floated at a PH of 8.5. Lime has been selected as the alkalinity modifier because of economy and availability.

If the minerals, which have been adequately freed by grinding, are made hydrophobic by the addition of re-agents, the minerals can be successfully separated from the waste when an air bubble attaches to the mineral surface and floats them to the surface, where it is skimmed off from the agitated pulp. The re-agents planned for use in the plant, which have been demonstrated effective in the Lab are shown in TABLE II.

TABLE II - FLOTATION RE-AGENTS

TRADE NAME	MANUFACTURER	DESCRIPTION
AREO 76	American Cyanimid	4-6 Carbon Alcohol
AREO 25	" "	Dithio Phosphate
AREO 317	" "	Zanthate - Alcohol plus Carbon Disulfide

90% of these re-agents report to the smelting concentrate, therefore, the tailings have only very minute quantities of these re-agents left in them after flotation, less than 1 PPM. No health problems are anticipated by their sparse usages.

TAILINGS DISPOSAL

After reclaiming 30% of the water from a thickener tank, densified tailings (± 50% solids) will be mixed with 5#'s per ton bentonite. They will be discharged to the proposed tails site (PLATE IV). The tails will be dispersed by a flume on a 1% grade at regular intervals along the top of the Dam to effect a separation of sand and slime. The sand will settle near the top of the Dam and the slime will migrate east away from the top. The sands will add strength to the Dam and increase the hight and width. When the tails reach an ultimate density of 74%, re-cycle water will be available to the mill. Because of the scarcity of water, all water must be re-cycled. No discharge from the Dam is contemplated.

1. CONSTRUCTION

The tails pond will be located in a depression created by a previous milling operation. A native earth dam is contemplated. Earth will be pushed up according to PLATE V (Section A-A) Existing North-South concrete walls will be utilized, which will re-inforce the proposed Dam and provide additional strength.

2. HAZARD POTENTIAL

The proposed tails dam site lies above the main drainage and 1000 ft. north of a runoff area, which could potentially rupture the Dam. The proposed site was chosen to eliminate the two drainages.

The use of re-cycle water will mean that the solids in the Dam will have the consistency of mud. Maintenance of a high density in the Pond would give further assurance that the waste would not migrate far into undesirable areas, if the Dam were to break.

Furthermore, any solids would be impounded by the huge tails pile to the West and seek a large depression immediately to the South. The Site selected represents the minimum potential for total environmental damage. The proposed plan insures no ground water contamination by the use of Bentonite and maintenance of a high solids to liquid ratio behind the Dam.

PHASE II - AGITATION CYANIDE LEACH

DESCRIPTION

The addition of a cyanide section to the flotation section is considered essential to economically treat the 300,000 ton stockpile west of the proposed tails Dam. The tails in PHASE I will report to four large diameter tanks to dissolve Gold & Silver. The Plant uses a conventional cyanide process, but differs slightly, in that a horizontal filter is used to make a liquid-solid separation rather than using thickeners to make the same separation. Nearly all cyanide solution is re-cycleable. The tails discharge as a filter cake. The new tails from this process will have the consistency of wet sand.

CYANIDE TAILS DISPOSAL

The Pond, consisting of 40,000 to 100,000 tons of bentonite treated tails in PHASE I will serve as the new base for the filter cake. In addition to the large quantity of bentonite in the Pond, the low moisture content of the cake (14%) will reduce the potential of ground water contamination to nearly zero. Before discharging to the Pond by conveyor, the tails will be sprayed first with sodium hypochlorate and second by a solution of petroleum sulfunate. The first application will oxidize the cyanide ion and the second will bind the cake to prevent wind erosion. If desired, the cake can be wheel packed to the hardness of road pavement with a loader.

HAZARD POTENTIAL

Two potential hazards exist, first dispersion of the cake by the wind after drying and second contamination of the ground water by cyanide solution.

The first hazard can be reduced completely by spreading the cake to the desired elevation, then compacting it and covering it with top soil.

The depth to ground water, the thickness of the tails in PHASE I and the hard pack of the filter cake above the tails to seal off rain and snow melt, make contamination of the ground water highly unlikely. Monitoring wells will further verify seepage of cyanide solution through the thick, treated bentonite tails.

RECLAIMATION

At the end of the project - ± 5 years, the large (± 300,000 ton) stockpile will be removed near the highway. The tails site will be continuously filled and reclaimed during the project, leaving little to be done upon completion.

All disturbed areas will be covered with soil, graded and seeded. Slopes will not exceed 4 : 1.

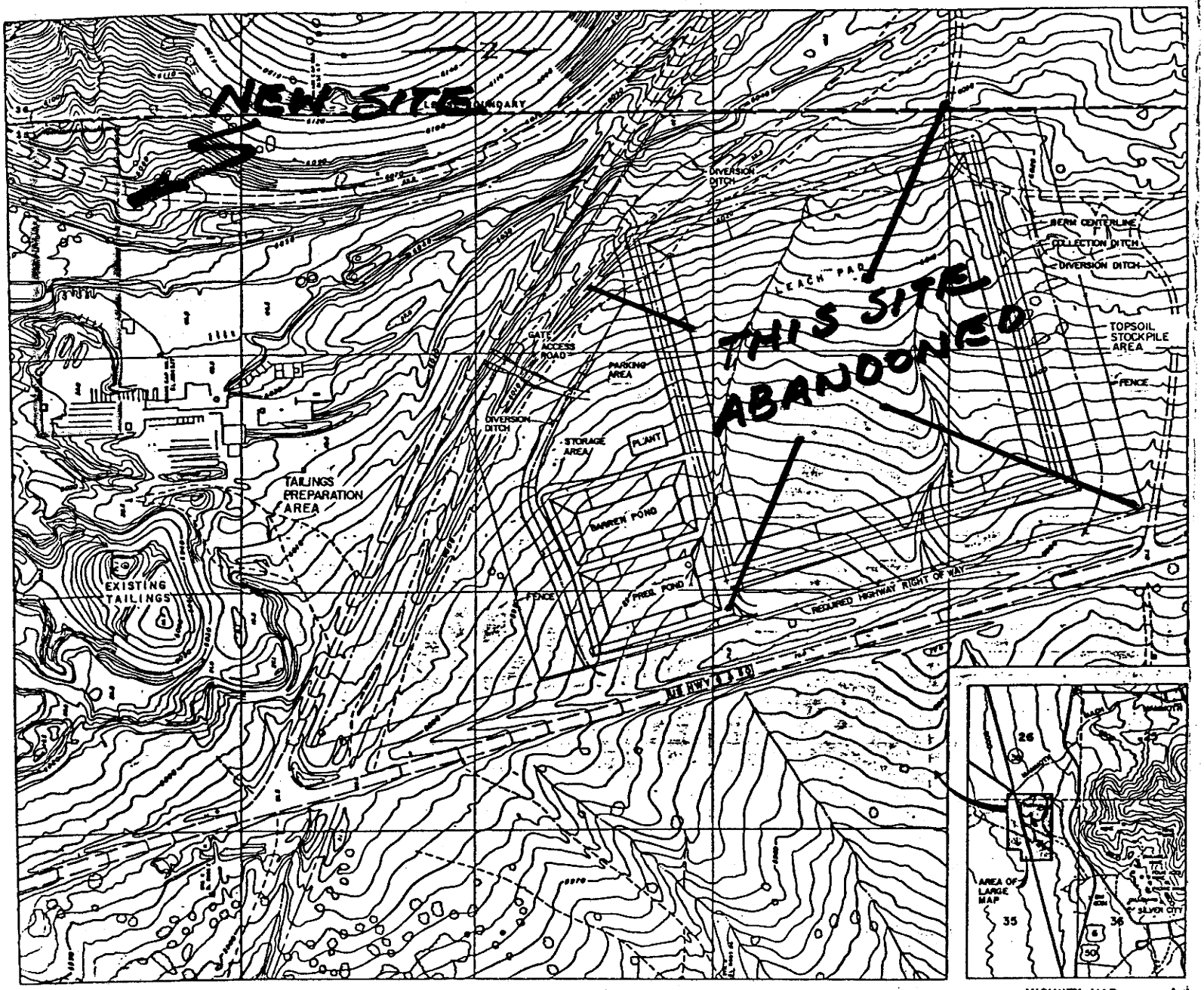
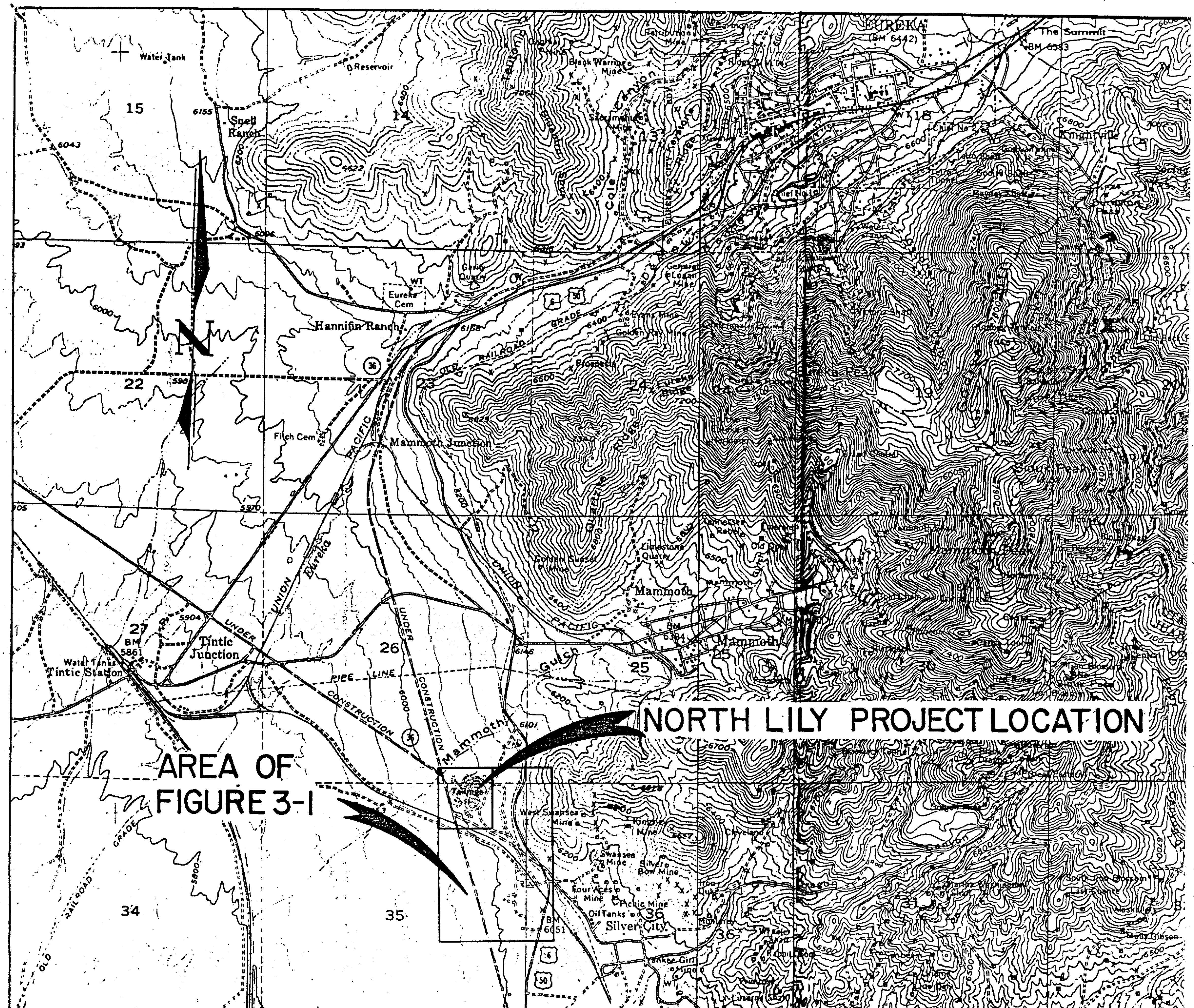

NEW SITE
THIS SITE ABANDONED
DIVERSION DITCH
LEACH PAD
BERM CENTERLINE
COLLECTION DITCH
DIVERSION DITCH
TOPSOIL STOCKPILE AREA
FENCE
GATE
ACCESS ROAD
PARKING AREA
DIVERSION DITCH
STORAGE AREA
PLANT
TAILINGS PREPARATION AREA
EXISTING TAILINGS
BARREN POND
PIPER POND
FENCE
REQUIRED HIGHWAY RIGHT OF WAY
NM HWY 90
AREA OF LARGE MAP
26
35
36
SILVER CITY
VICINITY MAP
N.T.S.

Fig. 1


NORTH LILY PROJECT LOCATION
AREA OF FIGURE 3-1
N
EUREKA
The Summit
Knightville
Snell Ranch
Hannifin Ranch
Mammoth Junction
Tintic Junction
Tintic Station
Water Tanks
Water Tank
Reservoir
Eureka Cem
Fitch Cem
Mammoth
Silver City
West Swansea Mine
Swansea Mine
Four Aces Mine
Oil Tanks
UNION PACIFIC
UNDER CONSTRUCTION
PIPE LINE
OLD RAILROAD GRADE
Quartzite Ridge
Cole Canyon
Mammoth Gulch
15
14
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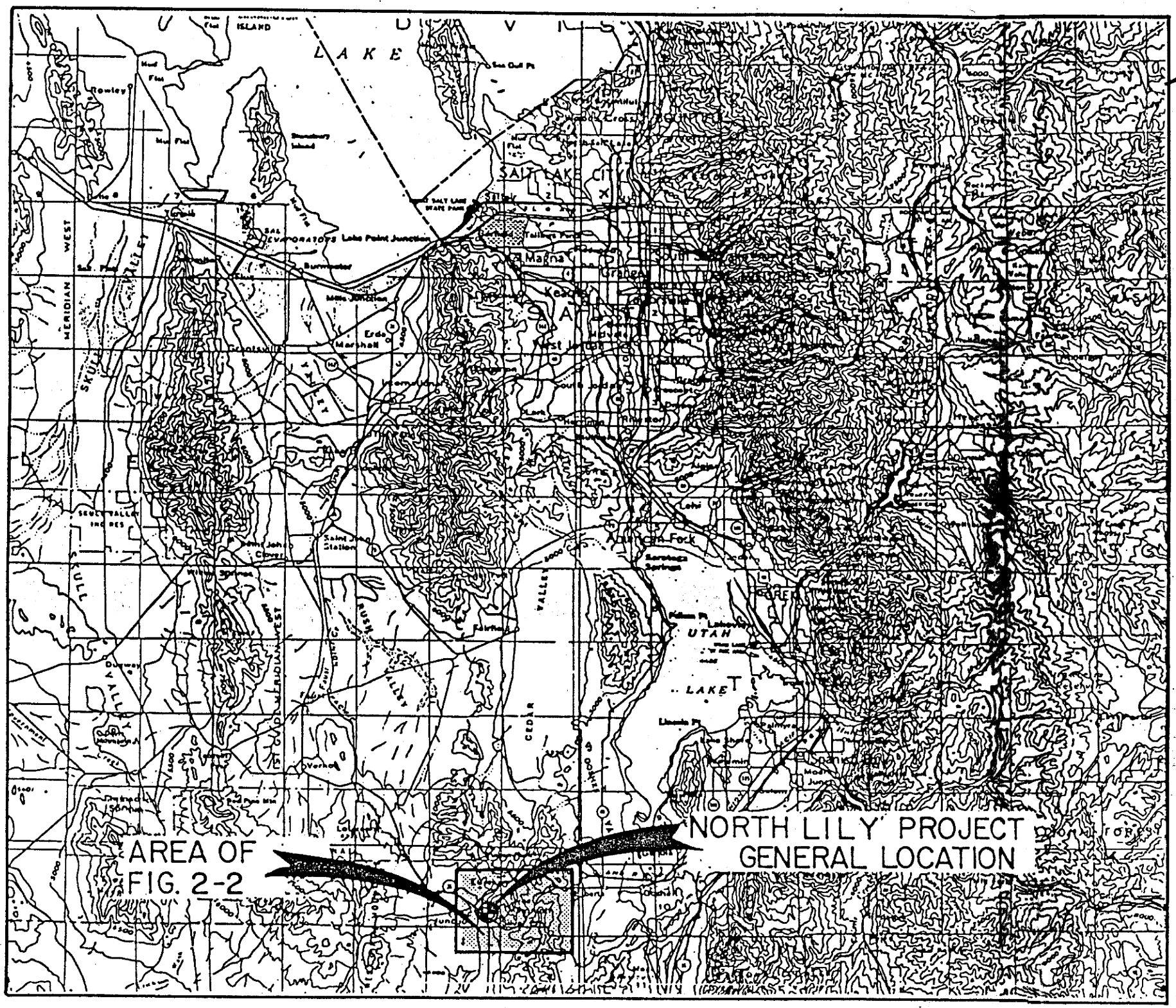
AREA OF
FIG. 2-2
NORTH LILY PROJECT
GENERAL LOCATION
SALT LAKE CITY
UTAH
LAKE
WEST
MERIDIAN
SKULL
VALLEY
CEDAR
10 5 0 10
SCALE IN MILES

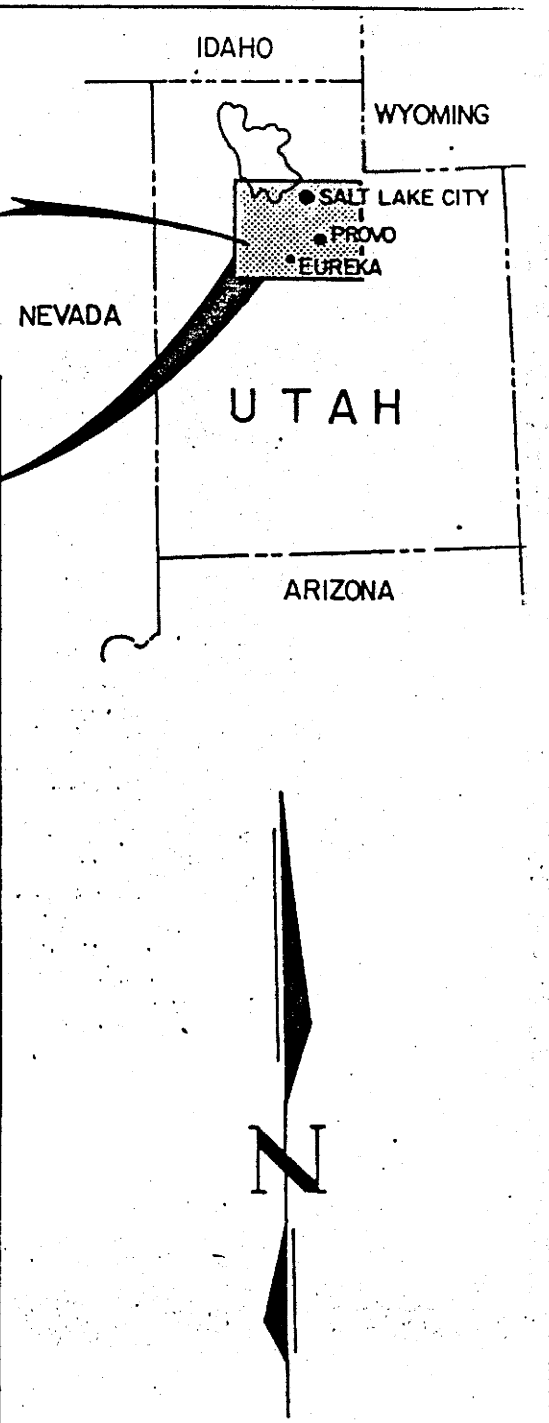
IDAHO
WYOMING
AREA OF
MAP BELOW
SALT LAKE CITY
PROVO
EUREKA
NEVADA
UTAH
ARIZONA
N

Fig 2